



Allergies: When the Immune System Backfires

Video Transcript

Diagnosing immediate type allergic disorders

[Andreas J. Bircher]: Diagnosis of immediate type allergies should be based on a four column principle. Patients do often visit a doctor at the moment when their suspected allergic symptoms are not active or have resolved. Therefore, a detailed history of known personal or familial allergies, the type of symptoms and signs, their onset and evolution, are paramount. It is also important to ask for suspected elicitors or known allergens.

This basis is then supplemented by a physical exam of the skin, the mucosae of eyes and nose, the lungs, and other organs if necessary. Sometimes, lung function tests, methacholine provocation test, sonography, or X-ray examinations may be necessary. A first important tool in allergology is the application of different types of skin tests. With these, the state of sensitization, meaning the reactivity of the immune system to a suspected allergen, can be demonstrated. If positive, the patient will experience a circumscribed red and itchy wheal. If correctly performed, neither a new sensitization nor elicitation of allergic symptoms do occur.

We use two different techniques for skin tests. In the skin prick technique, we apply standardised allergens onto the skin surface of the volar forearm or the upper back. We penetrate the skin superficially with a standard prick needle. If we use the intradermal technique, we inject sterile diluted solutions of allergens under the epidermis, creating a small bleed. This technique is mainly used for insect and drug allergies.

In both techniques, the doctor measures the size of the newly formed wheal and flare after 15 to 20 minutes. Negative and positive control samples are always tested alone. The negative control is usually a saline solution, while for the positive control a histamine sample is used. Positive skin tests imply the presence of specific IgE antibodies on the mast cells. For instance, sensitization to the respective antigen. If indicated, the doctor then complements the skin tests by measuring specific IgE in the serum or the activation of basophils upon allergen exposure, a test that is mainly done in insect and drug allergies. The presence of specific IgE indicates sensitization only. A positive basophil test further demonstrates activation of an effector cell.

To demonstrate clinically relevant allergies, the physician may apply provocation tests. In these tests, the exposure to an allergen similar to an everyday life situation is imitated. For example, sterile pollen or mite extracts are applied to the conjunctiva of the eye or the nasal mucosa. If positive, an allergic disease is likely. To sum up, the assessment of the medical history and the typical organ symptoms build the basis of the diagnosis. They are supplemented with skin and blood tests. Both of these tests demonstrate the presence of specific IgE antibodies but only indicate sensitization. A positive basophil test further demonstrates activation of an affected cell population.

Positive skin and blood tests are a prerequisite for a clinically relevant allergy. However, only a positive provocation test indicates a relevant allergic disease. This means that a high number of individuals may have positive skin or blood allergy tests, but do not necessarily suffer from symptoms. This is called latent sensitization.